

## Part A - General Information - World Athletics Corp

### Part A.1 - Introduction

You have been hired by World Athletics Corp to assist the company with their deployment of Microsoft Exchange 2000 Server. You are responsible for developing the messaging architecture and directory design to support Exchange 2000 Server while ensuring that your design meets the company's business and Information Technology (IT) goals.

### Part A.2 - Background

World Athletics Corp was created when four separate athletic equipment manufacturers merged. Each of the four companies had approximately 15,000 employees and offices on several continents.

World Athletics Corp has consolidated its offices so that it now has two offices on each major continent. This includes headquarters, five regional offices, and six local offices.

### Part A.3 - Company Profile

World Athletics Corp is the largest manufacturer of performance athletic training equipment in the world. Their product lines range from simple apparel, to hurdles, medicine balls, agility ladders, even chronograph systems for timing world class athletes in sprints. Anything used for high-caliber performance training can be found at World Athletics Corp. Their major market share includes all but three of the world's Olympic teams for summer and winter games, as well as a wide variety of professional and amateur sports. To ensure that World Athletics Corp consistently provides the best possible products and services, the company places a strong emphasis on research and design. Currently, World Athletics Corp has 68,000 employees distributed among its various offices.



#### **Part A.4 - Corporate Headquarters**

The corporate headquarters is located in Vancouver, Canada, and has approximately 30,000 employees.

#### **Part A.5 - Regional Office Locations and Number of Employees**

The following table lists the locations of World Athletics Corp' five regional offices and the approximate number of employees retained by each office.

Regional office location	Number of employees
Lima, Peru	5,000
Paris, France	4,250
Cape Town, South Africa	4,500
Moscow, Russia	2,850
Canberra, Australia	3,650

#### **Part A.6 - Local Office Locations and Number of Employees**

The following table lists the locations of World Athletics Corp's local office locations and the number of employees retained by each local office.

Local office location	Number of employees
Atlanta, U.S.	5,000
Rio de Janeiro, Brazil	2,500
Rome, Italy	2,000
Cairo, Egypt	3,000
Seoul, Korea	2,250
Brisbane, Australia	3,000

Approximately 10 percent of the employees in every office work remotely from home by using local Internet service provider (ISP) accounts. These employees only require remote access to corporate e-mail services. An additional 25 percent of the employees in each office work remotely because they travel frequently. When these employees travel, they use portable computers and virtual private network (VPN) connections to connect to the corporate network. Half of these traveling employees require off-line access to their mailbox data.

Because the company offices are distributed across multiple continents, it has been calculated that in any 24-hour period, the company is fully functional for 18 hours.

#### **Part A.7 - Regional Office Departments**

As a by-product of the merger of the four equipment manufacturers, the following regional offices now handle the following business functions:

Office	Business function
Canberra	Manages the Finance department
Cape Town	Manages the purchasing department for the manufacturing division and ensures all offices maintain up-to-date external contact lists
Lima	Manages the Human Resources department database by using SQL Server
Moscow	Manages the Internal Sales department
Paris	Manages the Research and Development department
Vancouver	Manages the IT department (handles customer service reports and manages the helpdesk database)

Each regional office also maintains general company-related information that is specific to its continent. For example, the Canberra regional office maintains company information for all other offices in Australia.

### **Part A.8 - Factors That Influence Business Strategies**

The board of directors of World Athletics Corp has delegated to the company managers the task of merging the four companies while ensuring that the resulting single company continues to provide superior products and services to all of its customers. The board required that the four former technology groups be consolidated, and that a company-wide messaging system be deployed.

## **Part B - IT Environment**

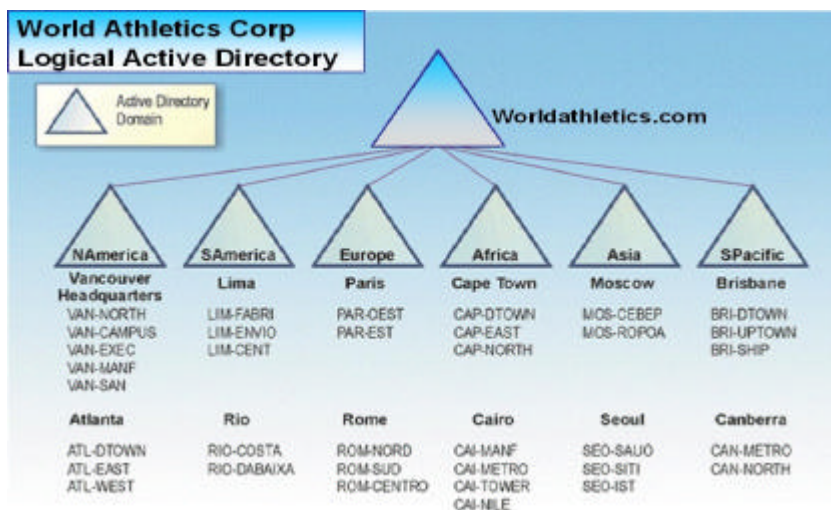
### **Part B.1 - Overview**

Each of the four companies that merged to create World Athletics Corp used Application Service Providers (ASPs) to provide e-mail services. One of the main technology goals for the new company is the deployment of Exchange 2000 Server for company-wide messaging.

All network servers are running Microsoft Windows 2000 Advanced Server, and the Active Directory directory service is running in native mode.

All client computers on the network are running Microsoft Windows 2000 Professional. The company plans to use Microsoft Outlook 2000 as the standard messaging client for all office employees, and for all of those traveling employees who require off-line access.

World Athletics Corp does not want to provide e-mail access software to remote users working from home.



## Part B.2 - Directory Design

Active Directory has been fully deployed across World Athletics Corp. The existing Active Directory design includes:

**Trees** One Active Directory tree.

**Domains** Seven Active Directory domains. Each domain spans two Active Directory sites. The offices on each continent are associated with a single Active Directory domain, as illustrated in Physical AD Topology. Each of these domains is a child domain to the root domain. The root domain does not host users, and is used for Active Directory operations only.

**Domain Controller Services** The domain controller services and global catalog services defined in the existing Active Directory design did not take Exchange 2000 server and client requirements into account.

**Groups** The CIO has asked that groups be structured in such a way that replication traffic is kept to a minimum. Currently, the administrators of each domain can create domain global and local groups at their own

discretion; but the creation of a Universal Group requires the approval of an enterprise administrator. The purpose of this policy is to minimize the number of Universal Groups, and thereby to improve logon performance and also to reduce global catalog replication traffic.

**Users** Users accounts and mailboxes are created by human resources (HR) personnel in each domain. User accounts and mailboxes are currently created by using Active Directory Users and Computers. A project is underway to automate this process by using scripts to integrate Active Directory with the corporate HR application.

World Athletics Corp wants to have one unified logon method for both local and remote users, so that those users do not have to know which domain their user accounts belong to in order to log on. For security purposes, the logon suffix should not match the default Simple Mail Transfer Protocol (SMTP) e-mail suffix.



### Part B.3 - Administrative Model

The IT group in the Vancouver office is responsible for creating and maintaining the routing infrastructure for Exchange 2000 Server. This group is also responsible for assigning Exchange 2000 Server permissions, and for managing Active Directory for the entire company.

Each regional office has an IT group, which is responsible for administering Exchange 2000 Server. These regional IT groups will provide support only for users and server computers running Exchange 2000 that are located on the local continent. These regional IT groups will not be assigning Exchange 2000 Server permissions.

Each office has a technical support group, which provides technical support and assistance to users in their home office. To be able to provide effective support to all users, the technical support group employees need to be able to view local Exchange 2000 Server settings, properties, and configurations. They also need to be able to view user properties in Active Directory.

## Part B.4 - Messaging Environment

Each user has an existing SMTP address that is based on the previous naming standards of their division or of their old e-mail system. Most international locations were previously known by another name, with an SMTP domain name specific to the previous company name and country name such as alias@company.co.country. It is required that these users be able to receive SMTP messages addressed to their old SMTP address in addition to a new unified SMTP address, such as alias@worldathletics.com.

In order to provide a workflow application, and to enable company-wide document collaboration and sharing, World Athletics Corp expects to regularly use public folders. The company wants the human resource and information technology databases to be the first to utilize the workflow capabilities of public folders. To maximize the available bandwidth on all wide area network (WAN) links, all employees should use local servers for public folders access.

The public folders used by the workflow application must be replicated at least every four hours, to ensure that employees are accessing the most recent data. To keep replication traffic over the WAN links to a minimum, all other public folders should be replicated only one each day.

To meet the CIO's request that replication traffic be kept to a minimum, message traffic should be controlled across slow links and across continental boundaries. The routing topology should closely match the physical network topology.

## Part B.5 - Business Goals

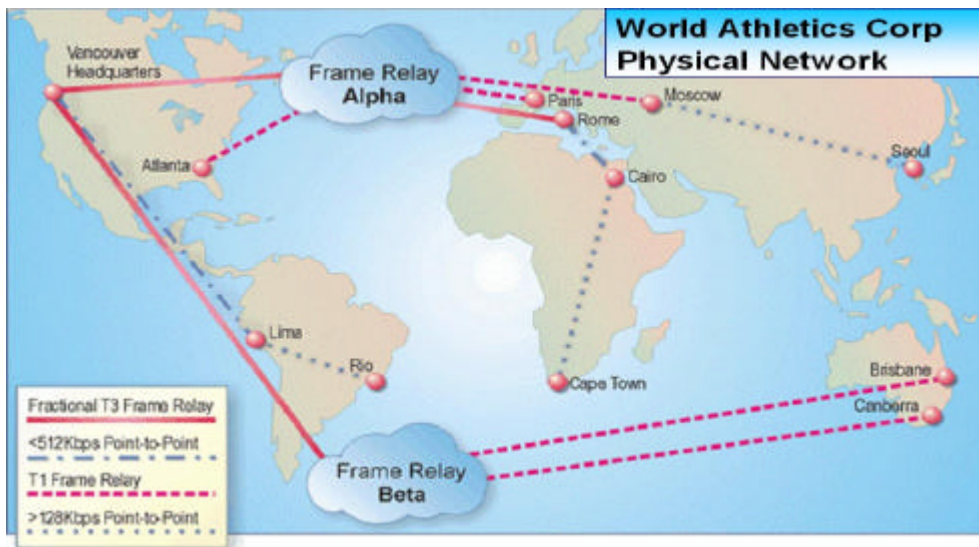
The following table lists each World Athletics Corp' regional office and its associated business goals.

Regional office	Business goal
Canberra	Because the Canberra office manages World Athletics Corp' Financial department and customer base, the office has expressed an interest in gaining access to the company contacts folder for billing purposes.
Cape Town	Because 20% of the Cape Town office's employees work with the Personnel department to place company employees on projects in various locations throughout the world, the office requires access to the human resources database.
Lima	Central management has expressed an interest in Lima becoming a new main point of contact for internal sales inquiries.
Moscow	Recently, the Moscow office expressed an interest

Paris	in gaining access to the company finance folder. Before the merger, Paris was the main point of contact for IT. Since the merger, Paris will act as a support channel for technical support for the Western hemisphere.
Vancouver	Vancouver houses the company executives who need access to research and development information.

To ensure that employees do not store large attachments or large numbers of old messages, World Athletics Corp wants to implement a 75 megabyte (MB) storage limit for each general employee. Company executives should not have a storage limit.

The server hardware that is available for the deployment of Exchange 2000 Server is able to support up to 1000 mailboxes on each server. Each server has two processors at 650 megahertz (MHz) each. Each server has a digital linear tape (DLT) tape drive for backups. The tape drive is able to back up approximately 15 gigabytes (GB) per hour.



## Part C - Network Infrastructure

### Part C.1 - Local Networks

Each office has a 100 megabits per second (Mbps) switched network for both servers and client computers. If more than one office is located in a city, the offices are connected by using local area network (LAN)-speed metropolitan area network (MAN) technology.

### Part C.2 - WAN-Frame Relay

World Athletics Corp has a wide area network (WAN) that consists of two Frame Relay Providers, and several point-to-point network connections.

The connection speed between each location and the Frame Relay Provider ranges between T1 and Fractional T3 speeds

The committed information rate (CIR) of each circuit is the same as the full speed of the connection.

The permanent virtual circuits (PVCs) defined between each physical location and the Frame Relay Provider are defined.

### Part C.3 - WAN-Point-to-Point

Along with the Frame Relay Providers, there are several point-to-point network connections around the organization. Each of the company's point-to-point network connections connect to a physical location that participates in the frame relay network.

All point-to-point connections are less than 512-Kbps but greater than 128-Kbps, as defined in the Physical Intranet Topology

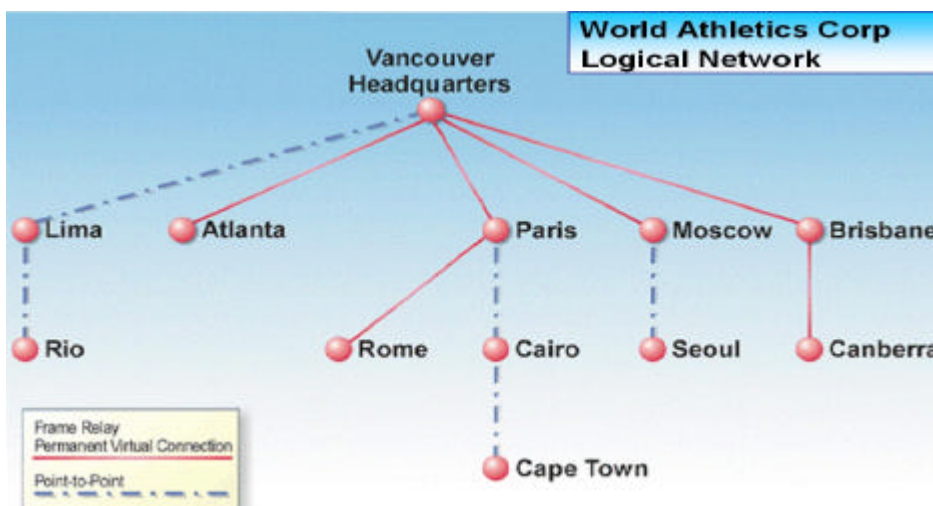
After analyzing all connections, the following were identified as the slowest:

- Vancouver-Lima
- Lima-Rio
- Rome-Cairo
- Cairo-Cape Town
- Seoul-Moscow

World Athletics Corp wants to be able to control message flow between the following regions:

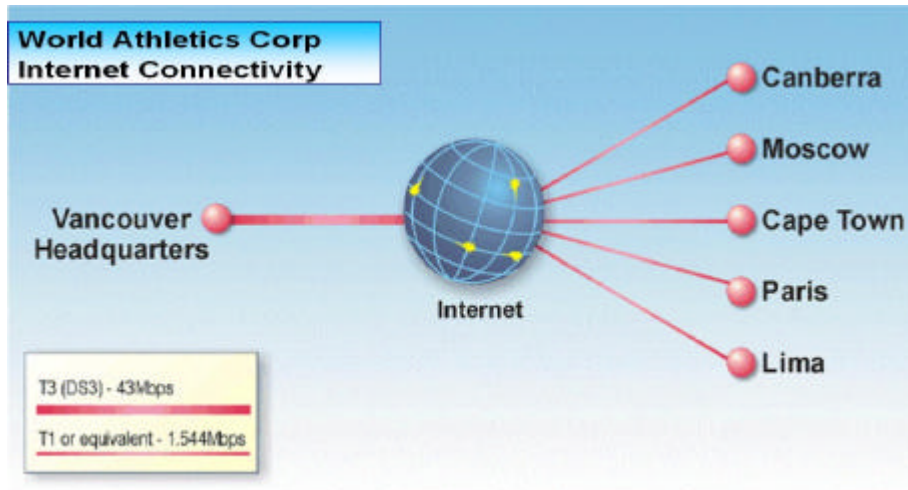
- North America and Europe
- North America and Asia
- North America and South Pacific
- North America and South
- America Europe and Africa

Because the company's headquarters has a large number of employees, World Athletics Corp has asked for recommendations regarding expanding the Storage Area Network to provide capacity planning and scalability for their Exchange 2000 Server implementation.



## Part C.4 - Internet Connectivity

One office on each continent has a connection to the Internet. These Internet connections are used mostly for remote user and home office user access to the corporate network.



## Part D - Security Requirements

To maximize security, and to prevent unauthorized snooping, network communications between servers running Exchange 2000 must be encrypted.

To improve security, all client computer connections that enable employees to access either the corporate network or servers in the perimeter network must use SSL encryption.

World Athletics Corp wants to ensure that its servers running Exchange 2000 are not used to relay unsolicited commercial e-mail (UCE). They also want to protect employees from receiving UCE messages and e-mail from non-existent Internet domains.

World Athletics Corp is concerned about virus infiltration and propagation and wants to protect each individual client desktop from infection by finding viruses before they enter the network.

Executives require access to system resources and they need a convenient way to send messages to each other. They do not want general employees to be able to send company-wide mail or to be able to send mail to an executive distribution list, and they do not want these employees to be able to see the list of members on an executive distribution list.

Each office has a perimeter network. Each perimeter network contains a server running Internet Information Services that provides Web content for World Athletics Corp' business partners and customers. Also, each office has a router-based firewall. The firewall is configured to allow only Hypertext Transfer Protocol

(HTTP/port 80) and Secure Sockets Layer (SSL/port 443) traffic into and out of the perimeter network. If it is necessary to do so in order to meet business requirements, additional ports can be opened.

Because it is considered a security risk, World Athletics Corp does not want user aliases to match SMTP aliases.

### **Part E - Archiving Requirements**

As a requirement for doing business with some of its customers, World Athletics Corp must save every e-mail message that was sent or received for a predefined number of years after the project is complete.

### **Part F - Availability Requirements**

To provide load balancing, front-end servers should be deployed in pairs.

No server running Exchange 2000 should have processor utilization that ever exceeds 60 percent.

Morning peak load lasts for approximately one hour, and approximately 10 percent of all users are accessing their data during this time.

Servers that are connected to the Internet must be configured to reduce the effectiveness of denial of service attacks.

### **Part G - Design Goals**

Because each office employs a large number of mobile users, World Athletics Corp wants to deploy a remote e-mail and public folder solution in every office. The public folder solution should enable users to access all public folder trees.

The World Athletics Corp' Exchange 2000 Server design should include dedicated server roles, such as a mailbox server, public folder server, front-end server, or bridgehead server

### **Part H - Interoperability Requirements**

Internet mail connectivity must be designed to provide both fault tolerance and load balancing. Also, the IT group in the Vancouver headquarters office must perform the management of all Internet mail connections